

the setting up of dissenting groups, as a result of straining, which resolved themselves after a time into the normal configuration. It further explained the fatigue of strength which was found to occur when a metal was subjected to repeated reversals of stress, a matter of great practical importance in the design of machines and engineering structures. The manner in which a piece broke, for example, after repeated bendings to and fro was discussed by aid of the molecular model. It was shown that the effects of slip are felt for some distance on either side of the plane of slip, a fatigued condition of the metal being established. This is especially the case when slip is many times repeated, backwards and forwards, and a condition is ultimately arrived at in which the cohesive bonds are broken and a crack results.

In conclusion, Dr. Ewing briefly referred to the relation between the molecular structure of the crystal grain, to which strength and elasticity were to be ascribed, and the finer structure which accounted in magnetic metals for the phenomena of magnetism. He had formerly shown that in the process of magnetisation in iron there was a turning round of a molecular axis possessing magnetic polarity. It was when the magnetically polar axes of all the molecules were turned round so as to face one way that the iron became "saturated." The polarity he was now concerned with was different in kind. It was not magnetic, and it existed in three directions, whereas the magnetic polarity with which the process of magnetisation was concerned was uniaxial. Moreover, the three-directional polarity concerned in crystal building did not suffer rotation when a magnetising force was applied. We had accordingly to think of the molecule as possessing polar axes which were non-magnetic and remained fixed under the control of forces of the same kind exerted by the poles of neighbouring molecules, and at the same time as possessing an inner structure characterised by uniaxial magnetic polarity, which was capable of rotation under the influence of an applied magnetising force while the non-magnetic polar axes remained fixed.

#### FORTHCOMING BOOKS OF SCIENCE.

MESSRS. BAILLIÈRE, TINDALL AND COX direct attention to:—"Practical Agricultural Chemistry," by F. Robertson; "Meat Inspection," by Dr. W. Robertson; "Blood Stains (a Medico-legal Book)," by Major Sutherland; "Trypanosomata and the Trypanosomiasis," by A. Laveran and F. Mesnil, translated and edited by Dr. D. Nabarro; and a new edition of "The Röntgen Rays in Medical Work," by Dr. D. Walsh, with section on apparatus and methods by Dr. L. Jones.

Messrs. A. and C. Black announce:—"Notes upon the Island of Dominica (British West Indies)," by S. Grieve, illustrated; "Rudolf Eucken's Philosophy of Life," by W. R. B. Gibson; "The Sense of Touch in Mammals and Birds, with Special Reference to the Papillary Ridges," by Dr. W. Kidd; "How to Fish," by W. E. Hodgson; "Man, his Manners and Customs," by L. W. Lyde; and "Descriptive Geography of the British Isles," by F. D. Herbertson.

Messrs. William Blackwood and Sons promise:—"In the Footsteps of Marco Polo, being the Account of a Journey Overland from Simla to Peking," by Major C. D. Bruce; "The Sovereignty of the Sea, an Historical Account of the Claims to the Exclusive Dominion of the British Seas and of the Evolution of the Territorial Waters, with Special Reference to the Rights of Fishing," by Dr. T. W. Fulton; "In Malay Forests," by G. Maxwell; and "Forest Entomology," by A. T. Gillanders.

In Messrs. Cassell and Co.'s list we find:—"Greenhouses and Conservatories, Constructing and Heating"; "Steel, its Varieties, Properties, and Manufacture"; "Domestic Hot Water Supply"; "Iron, its Sources, Properties, and Manufacture"; "Photographic Studios and Dark Rooms"; "Window Blinds"; "Tinplate Work"; "Rustic Carpentry"; "Pumps and Rams, their Action and Construction"; "Domestic Jobbing"; and "Zinc Working."

Messrs. Chatto and Windus give notice of:—"A History of Sumer and Akkad, being an Account of the Primitive

Inhabitants of Babylonia, with Maps and Illustrations after all the Principal Monuments of the Period in the British Museum and Elsewhere, and a Special Binding Design after a Monument of the Period," by L. W. King; and "The Paradise or Garden of the Holy Fathers, being Histories of the Anchorites, Recluses, Cœnobites, Monks, and Ascetic Fathers of the Deserts of Egypt between A.D. CCL and A.D. CCCC circiter, compiled by Athanasius, Archbishop of Alexandria, Palladius, Bishop of Helenopolis, Saint Jerome, and others, now translated out of the Syriac, with Notes and Introduction," by Dr. E. A. W. Budge.

Messrs. Archibald Constable and Co., Ltd., announce:—"European Animals, their Geological History and Geographical Distribution," by Dr. R. S. Scharff; "Natives of Northern India," by W. Crooke; "Universal Dictionary of Mechanical Drawing," by G. H. Follows; "Railroad Curve Tables for the Field Engineer," by R. S. Henderson; "Cranes," by A. Bottcher, translated from the German, enlarged, and edited with a complete description of English and American practice by A. Tolhausen; "Searchlights," by F. Nerz, translated from the German by C. Rodgers; "Agglutinants and Adhesives," by H. C. Standage; "Irrigation, its Principles and Practice as a Branch of Engineering," by Sir H. Brown; "Design of Irrigation Works," by W. Bligh; "Experimental and Theoretical Applications of Thermodynamics to Chemistry," by Prof. W. Nernst; "The Elastic Arch, with Reference to the Reinforced Concrete Arch," by B. R. Leffler; "Machine Design," by C. H. Benjamin; "A Text-book of Hydraulics, including an Outline of the Theory of Turbines," by L. M. Hoskins; "Fuel, Water, and Gas Analysis," by J. B. Kershaw; "Gas, Oil, and Solid Fuel," by Prof. V. B. Lewes; "Gold and Precious Metals," by Dr. T. K. Rose; "Electrometallurgy," by J. B. C. Kershaw; "Electrical Distribution of Power," by J. H. Davis; "Gas Light and Heating," by W. H. Y. Webber; "Coal," by J. Tonge; "Iron and Steel," by J. H. Stansbie; "The Manufacture of Paper," by R. W. Sindall; "India-rubber and Gutta-percha," by H. L. Terry; "Wood Pulp and its Applications," by C. F. Cross, E. J. Bevan, and R. W. Sindall; "Steam Engines," by J. T. Rossiter; "Glass," by W. Rosenhain; "Electric Lamps," by M. Solomon; "Steam Locomotives," by V. Pendred; "Patents, Trade Marks, and Designs," by K. R. Swan; and "Photography," by A. Watkins.

Messrs. J. M. Dent and Co.'s list includes:—"Nature-study," by Prof. J. R. A. Davis; "Trigonometry," by C. Hawkins; "Fly-fishing," by Sir E. Grey, illustrated; "Our Gardens," by the late Dean Hole and G. S. Elgood; and "Farming," by W. M. Tod, illustrated.

Messrs. Duckworth and Co. announce:—"The Interpretation of Nature in Earlier Greek Art," by E. Löwy, translated and illustrated; and a new edition of "A Text-book of Plant Diseases," by G. Massee.

In Messrs. Everett and Co.'s list appears:—"Charts of the Diseases of the Horse, with Explanatory Notes and Prescriptions," by C. Gresswell.

Mr. Gustav Fischer (Jena) will publish:—"Die Bakteriologie des Auges," by Prof. Axenfeld, illustrated; "Das Dysenterietoxin," by Dr. R. Doerr, illustrated; "Geologische und Palaeontologische Abhandlungen," edited by E. Koken, Band viii., Heft iii., illustrated; "Die Grosshirnrinde des Menschen in ihren Massen und in ihrem Fasergehalt," by Dr. T. Kaes, 1 Teil, text, 2 Teil, illustrations; "Praktikum der Bakteriologie und Protozoologie," by Drs. K. Kisskalt and M. Hartmann; "Jahresbericht der Literatur über physische Anthropologie im Jahre 1905," by Dr. E. Fischer, edited by Dr. G. Schwalbe. "Normentafeln zur Entwicklungsgeschichte der Wirbeltiere," edited by Prof. F. Keibel, Siebentes Heft, "Normentafel zur Entwicklungsgeschichte des Koboldmaki (Tarsius Spectrum) und des Plumpkori (Nycticebus Tardigradus)," by Prof. A. A. W. Hubrecht and F. Keibel, illustrated; "Progressus rei Botanicae, Fortschritte der Botanik, Progrès de la Botanique, Progress of Botany," edited for the International Association of Botanists by Dr. J. P. Lotsy, Erster Band, Zweites Heft; "Verhandlungen der deutschen pathologischen Gesellschaft," Zehnte Tagung gehalten in Stuttgart vom September 17-21, 1906,

Jahrgang 1906, illustrated; "Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer *Valdivia* 1898-1899," Fünftehnter Band, 1 Lieferung, die Tiefsee-Fische, by Prof. A. Brauer, Systematischer Teil, illustrated; "Zoologische Forschungsreisen in Australien und dem Malayischen Archipel," by Prof. R. Semon, Dritter Band, Monotremen und Marsupialier II., 2 Teil, 3 Lieferung, illustrated; and "Klinisches Jahrbuch," Sechzehnter Band, Zweites Heft, illustrated.

Mr. H. Frowde promises:—"Australasia," by J. D. Rogers, being the sixth volume of the "Historical Geography of the British Colonies"; "The Dillenian Herbaria: an Account of the Dillenian Collections in the Herbarium of the University, together with a Biographical Sketch of Dillenius, Selections from his Correspondence, Notes, &c.," by G. C. Druce, edited, with an introduction, by Prof. S. H. Vines, F.R.S.; "Ancient Khotan," detailed Report of Archaeological Exploration in Chinese Turkestan, carried out and described under the Orders of H.M. Indian Government by M. A. Stein, 2 vols.; and "Surgical Instruments in Ancient Times," by J. S. Milne.

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Mr. W. Heinemann's list contains:—"A Handbook of Metabolism," by Prof. C. von Noorden, English translation, edited by Dr. I. W. Hall, 3 vols.; "The Nutrition of Man," by Prof. R. H. Chittenden, illustrated; "The World's History, a Survey of Man's Record," edited by Dr. R. F. Helmolt, vol. v., "Eastern Europe"; "Eclipse and O'Kelly," by T. A. Cook, illustrated; and "Wild Flowers of the British Isles," written by H. I. Adams, illustrated.

Messrs. Hodder and Stoughton promise:—"Brain and Personality, or the Physical Relations of the Brain to the Mind," by Dr. W. H. Thomson, illustrated; and "The Book of the Open Air," by E. Thomas, twelve monthly parts, illustrated.

The list of Messrs. Hutchinson and Co. contains:—"Extinct Birds," by the Hon. W. Rothschild, illustrated; "The World's Peoples," by Dr. A. H. Keane, illustrated; "In Wildest Africa," by C. G. Shillings, translated by F. Whyte, 2 vols., illustrated; "Nearest the Pole," by Commander R. E. Peary, illustrated; and "Maori and Polynesian," by J. M. Brown.

Messrs. P. S. King and Son direct attention to:—"The Infant, the Parent, and the State, a Social Study and Review," by H. L. Heath; and "Central Poor-law Conference, 1907, Report of the Proceedings of the Central Poor-law Conference held on February 19 and 20 at the Guildhall, London"; "Poor-law Conferences, 1906-7, Annual Volume containing the Reports of the Proceedings of the Central and District Conferences held from May,

1906, to February, 1907, with the Report of the Central Committee."

Mr. John Lane's list contains:—"Ornithological and other Oddities," by F. Finn, illustrated; "Forms of Paralysis," by Dr. J. S. Collier; "The Post-mortem Handbook," by Dr. C. R. Box; "Minor Operations," by E. M. Corner; "Book of Rock and Water Gardens," by C. Thonger; "The Book of the Chrysanthemum," by P. S. Follwill; "The Book of Fruit Bottling," by E. Bradley and M. Crooke; and a new edition of "The Tree Book," by M. R. Jarvis.

Messrs. Crosby Lockwood and Son give notice of:—"Modern American Lathe Practice," by O. E. Perrigo, illustrated; "Graphical Handbook for Reinforced Concrete Design," by J. Hawkesworth, with an appendix containing the requirements of the Building Code of New York City in regard to reinforced concrete, illustrated; "The Construction of Dynamos (Alternating and Direct Current), a Text-book for Students, Engineer-constructors, and Electricians-in-charge," by T. Sewell, illustrated; "A Handbook of Wireless Telegraphy: its Theory and Practice, for the Use of Electrical Engineers, Students, and Operators," by Dr. J. Erskine-Murray, illustrated; "The Twentieth Century Book of Recipes, Formulas, and Processes, containing nearly 10,000 Selected Scientific, Chemical, Technical, and Household Recipes, Formulas and Processes, for Use in the Laboratory, the Office, the Workshop, and the Home," edited by G. D. Hiscox, illustrated; and new editions of "Mechanical Engineer's Pocket-book of Tables, Formulae, Rules, and Data, a Handy Book of Reference for Daily Use in Engineering Practice," by the late D. K. Clark, revised by H. H. P. Powles; and "A Handbook for Brewers, being a Practical Guide to the Art of Brewing and of Malting," by H. E. Wright, illustrated.

Messrs. Longmans and Co.'s announcements include:—"Design in Nature, illustrated by Spiral and other Arrangements in the Inorganic and Organic Kingdoms as exemplified in Matter, Force, Life, Growth, Rhythms, &c., especially in Crystals, Plants, and Animals," by Dr. J. B. Pettigrew, F.R.S., illustrated; "Nature Round the House, a Simple Natural History for Small Students," by P. Wilson, illustrated; "Hydraulics," by Prof. S. Dunkerley, 2 vols.; "Electro-physiology of Plants," by Prof. J. C. Bose, illustrated; "Investigation on the Theory of the Photographic Process," by Drs. S. E. Sheppard and C. E. K. Mees; "The Teaching of Mathematics in the Elementary and the Secondary School," by Dr. J. W. A. Young; and "Systematic Researches in Thermo-chemistry, Numerical and Theoretical Results," by J. Thomsen, translated by K. A. Burke.

In the list of Messrs. Macmillan and Co., Ltd., are to be found:—"Inflammation," by Prof. J. G. Adami, F.R.S.; "Mining Tables," by Hatch and Valentine; "Geometry Papers," by R. Deakin; "Steam and Other Engines," by J. Duncan; and new editions of "Modern Views of Electricity," by Sir Oliver Lodge, F.R.S.; "A Hunter's Wanderings in Africa," by F. C. Selous; and "Woolwich Mathematical Papers," edited by E. J. Brooksmith.

Mr. Elkin Mathews directs attention to:—"The Days of a Year, a Naturalist's notes from January 1 to December 31, 'the Harvest of a Quiet Eye.'"

Mr. Murray's list includes:—"Life and Adventures of Captain Cook, R.N., the Great Circumnavigator of the World," by A. Kitson, illustrated; "Cretan Excavations and their Bearing on Early History," by Prof. R. M. Burrows; "Heredity," by Prof. J. A. Thomson; "Recent Development in Biological Science," by W. B. Hardy, F.R.S.; "A Primer of Psychology," by L. Brackenbury; "Notes on the Teaching of Elementary Chemistry, with a Sequence of Experiments on Air and Combustion," by J. B. Russell (teacher's edition).

Messrs. A. Owen and Co. announce:—"The Moon in Modern Astronomy," by P. Fauth.

Messrs. George Philip and Son, Ltd., will publish:—"A New Physical Geography for Intermediate and Secondary Schools," by E. O. Williams; and "Builders of the Body," by E. Miles.

Sir Isaac Pitman and Sons, Ltd., give notice of new editions of "Great Astronomers," "In Starry Realms,"



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Messrs. G. P. Putnam's Sons' list contains:—"The Family, an Ethnographical and Historical Outline, with Descriptive Notes, planned as a Text-book for the Use of College Lecturers and Directors of Home-reading Clubs," by Dr. E. L. Parsons; "Hunting Big Game with Gun and with Kodak: how Wild Animals Look and Live in their Haunts, from Personal Experiences in the United States, Dominion of Canada, and Old Mexico," by W. S. Thomas, illustrated; "On the Great American Plateau, Wanderings among Canyons and Buttes in the Land of the Cliff Dweller, and the Indian of To-day," by T. M. Prudden, illustrated; "Diagnosis of Organic Nervous Diseases," by Dr. C. A. Herter, revised by Dr. L. P. Clark, illustrated; "The Sporting Rifle," by W. Winans, illustrated; "Scientific Sanction for the Use of Alcohol," by Dr. J. Starke; "The Muscles of the Eye," by Dr. L. Howe, 2 vols.; "Philosophical Problems in the Light of Vital Organisation," by E. Montgomery; and a new edition of "A Manual of Prescription Writing, with a Full Explanation of the Methods of Correctly Writing Prescriptions, and Rules for avoiding Incompatibilities and for Combining Medicines," by Dr. M. D. Mann.

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Messrs. Smith, Elder and Co. give notice of:—"Animal Life," by Dr. F. W. Gamble, illustrated; and "The South Polar Times," reproduced in facsimile, the periodical brought out by the officers of the National Antarctic Expedition on board the *Discovery* during the Antarctic winters of 1902 and 1903, illustrated.

Messrs. Swan Sonnenschein and Co., Ltd., direct attention to:—"How to Study Geology," by E. Evans; and a new edition of "Life by the Sea-shore, an Introduction to Natural History," by Dr. M. Newbigin.

Messrs. E. and F. N. Spon, Ltd., announce:—"The Smith and Forgemans' Handbook of Practical Smithing and Forging," by T. Moore; "English Weights, and their Equivalents in Kilogrammes," by F. W. A. Logan; "The Stoker's Catechism," by W. J. Connor; "A Treatise on the Grouping of Electric Cells," by W. F. Dunton; "Experimenting with Induction Coils," by H. S. Norrie; "Mechanical Draft, a Practical Handbook for Engineers and Draftsmen," by J. H. Kenealy; "Types and Details of Bridge Construction," by F. W. Skinner, part ii., "Plate Girders"; "Designs for Small Dynamos and Motors," by C. P. Poole; and new editions of "A Treatise on Surveying," compiled by R. E. Middleton, O. Chadwick, and J. Du T. Bogle, part ii.; and "The Management of Electrical Machinery," by F. B. Crocker and Dr. S. S. Wheeler.

Mr. Edward Stanford announces:—Vol. i. of "Australasia" in Stanford's "Compendium of Geography and Travel," by Prof. J. W. Gregory, F.R.S., illustrated.

Mr. Elliot Stock promises:—"Natural History of the British Butterflies," by J. W. Tutt, vol. i., illustrated.

The University Tutorial Press, Ltd., will issue:—"Plant Biology," by Dr. F. Cavers; and a new edition

of "Physiography," by Drs. R. W. Stewart and W. Briggs.

Mr. Fisher Unwin's list contains:—"Woodlanders and Field Folk," by J. Watson; "The Birds of Middlesex," by J. E. Harting, illustrated; "The Psychology and Training of the Horse," by Count E. M. Cesaresco; "The Principles and Practice of X-Ray Diagnosis and Therapy," by Dr. J. Rudis-Jicinsky, with the collaboration of C. H. Treadwell and Dr. J. Hoffman, illustrated; and "The Horse, a Pictorial Guide to its Anatomy," 110 drawings (reproduced by photolithography) by H. Dittrich, with explanatory notes by Profs. Ellenberger and Baum.

Messrs. Watts and Co. announce:—"An Essay Outline of Evolution," by D. Hird.

The following are Messrs. Whittaker and Co.'s announcements:—"Modern Practice of Coal Mining," by D. Burns and G. L. Kerr; "Armature Construction," by H. M. Hobart and A. G. Ellis; "Electricity in Mining," by P. R. Allen; "Electric Lamps and Photometry," by L. Gaster; "Motor-car Construction," by T. Gray; "The Care of Motor Cars," by T. Gray; and "An Advanced Text-book of Steam, Gas, and Oil Engines," by J. W. Hayward.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The master and fellows of University College have established a "Radcliffe prize" for the encouragement of research in medical science; it will be awarded every second year alternately with the Rolleston prize. Its value is 50*l.*, and it is open to all graduates who have not exceeded twelve years from the date of passing the last examination for the degree of Bachelor of Arts, and are not Radcliffe fellows at the date of application. Candidates must send in their memoirs to the secretary to the boards of faculties on or before June 1.

CAMBRIDGE.—The Master of Trinity Hall has consented to act, and will be formally appointed to act, as deputy for the Vice-Chancellor for the period from March 22 to April 24, when the Vice-Chancellor will be absent in America representing the University at the opening of the Carnegie Institute.

The subject selected for the Adams prize in 1908 is "The Radiation from Electric Systems or Ions in accelerated Motion and the Mechanical Reactions on their Motion which arise from it." The prize is open to the competition of all persons who have at any time been admitted to a degree in this University. The essays must be sent in to the Vice-Chancellor on or before December 16, 1908, privately. The successful candidate will receive about 225*l.*

A university lecturer in pathology will shortly be appointed. The stipend is 100*l.* per annum. Candidates are requested to send their names and testimonials to the Vice-Chancellor on or before April 19.

The next combined examination for sixty-six entrance scholarships and various exhibitions at Pembroke, Gonville and Caius, King's, Jesus, Christ's, St. John's, and Emmanuel Colleges will be held on December 3 and following days. Mathematics and natural sciences will be the subjects of examination at all the above-mentioned colleges. A candidate for a scholarship or exhibition at any of the seven colleges must not be more than nineteen years of age on October 1, 1907. Forms of application for admission to the examination at the respective colleges, and further information respecting the scholarships, may be obtained as follows:—Pembroke College, Mr. W. S. Hadley; Gonville and Caius College, the Master; King's College, Mr. W. H. Macaulay; Jesus College, Mr. A. Gray; Christ's College, Rev. J. W. Cartmell; St. John's College, Dr. J. R. Tanner; Emmanuel College, the Master.

DR. H. T. BARNES, assistant professor of physics in McGill University, Montreal, has been appointed professor of experimental physics in succession to Prof. E. Rutherford, F.R.S.